The Commonwealth of Massachusetts

DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

D.T.E. 04-06

Petition of New England Gas Company, pursuant to G.L. c. 164, § 69I, for approval by the Department of Telecommunications and Energy of its Long-Range Forecast and Supply Plan for the five-year period November 1, 2003, through October 31, 2008.

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I. INTRODUCTION AND PROCEDURAL HISTORY

On December 30, 2003, pursuant to G.L. c. 164 § 69I, New England Gas Company ("New England Gas" or "Company") filed with the Department of Telecommunications and Energy ("Department") a petition for approval of its long-range forecast and supply plan for the period of November 1, 2003 through October 31, 2008 ("Plan"). The petition was docketed as D.T.E. 04-06.

New England Gas was organized in 2000 following the mergers of North Attleboro Gas Company ("North Attleboro") and Fall River Gas Company ("Fall River") with Southern Union Company ("Southern Union"). Southern Union - Fall River/North Attleboro Acquisition, D.T.E. 00-25/00-26 (2000). New England Gas is a division of Southern Union serving approximately 50,000 customers in several communities in Southeastern Massachusetts.

Pursuant to notice duly issued, the Department conducted a public hearing and procedural conference in Boston on March 10, 2004. The Attorney General of the Commonwealth intervened as a matter of right, pursuant to G.L. c. 12, § 11E. An evidentiary hearing was held at the Department's offices on September 8, 2004. New England Gas presented three witnesses in support of its Plan: James Harrison, vice-president of Management Applications Consulting; Debbie L. Gajewski, vice-president of Management Applications Consulting; and Gary Beland, director of gas supply for New England Gas. The evidentiary record includes 101 exhibits and three responses to record requests. The Company and the Attorney General both submitted briefs.

II. ANALYSIS OF THE LONG-RANGE FORECAST

A. Standard of Review

Pursuant to G.L. c. 164, § 69I, the Department is required to ensure "a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost." In accordance with this mandate, the Department reviews the long-range forecast of each gas utility to ensure that the forecast accurately projects the gas sendout requirements of the utility's market area. G.L. c. 164, § 69I. A forecast must reflect accurate and complete historical data, and reasonable statistical projection methods. Id.; 980 C.M.R. § 7.02(9)(b). Such a forecast should provide a sound basis for resource planning decisions. Bay State Gas Company, D.T.E. 02-75, at 2 (2004); The Berkshire Gas Company, D.T.E. 02-17, at 2 (2003); The Berkshire Gas Company, 16 DOMSC 53, at 56 (1987).

In its review of a forecast, the Department determines if a projection method is reasonable based on whether the methodology is: (a) reviewable, that is, contains enough information to allow a full understanding of the forecast methodology; (b) appropriate, that is, technically suitable to the size and nature of the particular gas company; and (c) reliable, that is, provides a measure of confidence that the gas company's assumptions, judgments, and data will forecast what is most likely to occur. D.T.E. 02-75, at 2; D.T.E 02-17, at 2; Haverhill Gas Company, 8 DOMSC 48, at 50-51 (1982). Specifically, the Department examines a gas company's: (1) planning standards, including its weather data; (2) forecast method, including the forecast results; and (3) derivation and results of its design and normal sendout forecasts. See D.T.E. 02-75, at 2-3; D.T.E. 02-17, at 3; see also Boston Gas Company, D.P.U. 94-109

(Phase I) at 9 (1996). As part of the review of the forecast, the Department also examines the company's scenario analysis, which is used for evaluating the flexibility of the company's planning process, including any cold-snap analysis[1] and sensitivity analysis. D.T.E. 02-75, at 3; D.T.E. 02-17, at 3; Boston Gas Company, 25 DOMSC 116, at 200 (1992) ("1992 Boston Gas Decision").

B. Previous Sendout Forecast Results

The Company's most recent sendout forecasts were approved in North Attleboro Gas Company, D.T.E. 01-47 (2002), and Fall River Gas Company, D.T.E. 99-26 (2000). The Department directed North Attleboro, in its next forecast, to justify the use of different ranges of data as bases for developing its normal-year, design-year, design-day, and cold snap planning standards. D.T.E. 01-47, at 22-23. The Department issued three directives to Fall River: (1) refine the determination of its design-year standard and design-day standard by further review of the costs and benefits to its customers of maintaining different levels of reliability; (2) identify any additional migration to transportation service and evaluate how such changes in the transportation market, including the impact of the unbundling process will affect the Company's sendout forecast; and (3) refine its sendout forecast by developing variables that explain customer usage and seasonal variation in greater detail. D.T.E. 99-26, at 35.

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[1] A cold snap is a prolonged series of days at or near design conditions. Colonial Gas Company, D.P.U. 93-13, at 66 (1995); 1992 Boston Gas Decision at 217; Commonwealth Gas Company, 17 DOMSC 71, at 137 (1998).

C. Planning Standards

The first element of the Department's forecast review is an assessment of a company's planning standards in order to determine if they are reviewable, appropriate, and reliable. D.T.E. 02-75, at 2; D.T.E 02-17, at 2; 8 DOMSC 48, at 50-51. A company's planning standards are used as a basis for projecting its sendout forecast, which, in turn, is used to ascertain the adequacy and cost of a company's supply plan. Id. The Department's review of a company's planning standards begins with an examination of a company's weather data, and continues with an analysis of how a company arrived at its normal year, design year, and design day standards.[2] Id.

1. Weather Data

a. Description

The Company's weather database consists of daily effective degree days ("EDD")[3] commencing in 1965, as provided by Weather Services International[4] ("WSI") (Exh. NEG-1, at 7). WSI used data for the Providence, Rhode Island area, which is in close proximity to the Company's service territory (Exh. DTE-2-22). Based on a detailed statistical analysis of the data, the Company decided to use the EDD data as the basis for its load projections

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[2] The design day represents the coldest day for which the Company plans to provide reliable firm service.

[3] A degree day indicates how far a day's average temperature departs from 65°F, without regard to wind speed in determining the coldness of the weather. An effective degree day takes into account wind speed in determining the coldness of the weather.

[4] Formerly know as Weather Services Corporation.

(Exh. NEG-1, at 6-7). Management Applications Consulting ("MAC") then incorporated the data into its study (id.).

b. Analysis and Findings

The Department finds that because New England Gas uses weather data appropriate to its service territory, its use of the weather data described within the MAC study is appropriate for input into its planning standards (Exh. NEG-1, at 7). The Department has previously found the use of EDDs from WSI to be an appropriate input to a local distribution company's planning standard. D.T.E. 99-26, at 5. The Department finds that the Company's nearly 38-year database from WSI is comparable to other weather databases approved previously by the Department. Colonial Gas Company, 23 DOMSC 351, 363-364 (1991) ("1991 Colonial Gas Decision"); 1992 Boston Gas Decision, at 135-136; D.T.E. 99-26, at 4; Colonial Gas Company, D.P.U. 93-13, at 10 (1995). Therefore, the Department concludes that New England Gas has developed an adequate database from which to develop the Company's planning standards. The Department finds that the weather data used by New England Gas is reviewable, appropriate, and reliable.

2. Normal Year Standard

a. Description

New England Gas developed its normal year standard using 20 years of weather data (Exh. NEG-1, at 8). The Company first computed the average annual degree days for the most recent 20-year period, 1984-2003 (id., Sch. 2-1). Next, the Company computed the average degree days in each month over the same period (id., Sch. 2-2). The Company then modeled

the typical day-to-day variation in degree days by (1) selecting a typical month whose total degree days were similar to the 20-year average and standard deviation for each month, and (2) prorating the daily values to match exactly the 20-year average for the month (id. at 8 and Sch. 2-2). These prorated values served as a proxy for daily heating degree days for the normal year (id. at 8). Based on this method, the Company calculated its normal year standard of 6,218 EDD (id., Sch. 2-2). The Company expects that 5,392 EDD will comprise the heating season (id.).

b. Analysis and Findings

The use of an arithmetic average of historical degree day data to establish a normal year standard has been accepted previously by the Department. KeySpan Energy Delivery New England, D.T.E. 01-105, at 9 (2003); D.T.E. 99-26, at 6; Colonial Gas Company, D.P.U. 96-18, at 9 (1996); 1992 Boston Gas Decision at 136; 1991 Colonial Gas Decision at 363-364. Because New England Gas based (1) its normal year standard on an historical average of its data, and (2) its planning standards on an acceptable weather database, the Department finds that the method used by New England Gas for determining its normal year standard is reviewable, appropriate, and reliable.

3. Design Year Standard

a. Description

New England Gas developed its design year standard pursuant to a probabilistic analysis. First, the Company computed the degree days for the 20-year period in order to calculate the average and standard deviations for the entire period (Exh. NEG-1, at 4). The

Company explained that in order to estimate the heating season and non-heating season design year degree days, it computed the design-year winter heating degree day level by subtracting degree days in the six-month, off-peak period from the total split-year degree days (id. at 9). Next, the Company allocated the computed design-year total winter heating degree days to the peak period (November through April) (id.). This allocation process was necessary to ensure a realistic monthly projection (id.). The Company concluded that a one-in-58 design-year standard results in a 6,996 EDD design year (6,170 EDD heating season peak period plus 826 EDD non-heating season) (id.; Exh. NEG-1, Sch. 2-2).

The Company noted that the design year was further adjusted by increasing the coldest day (January 16) of the design year to reflect a design day, and then reducing, on a pro rata basis, the remaining days of the month by an equivalent amount (id., at 10). This adjustment was made to develop the most rigorous weather criteria possible for planning purposes.

New England Gas evaluated its design year standard using a cost-benefit analysis. The Company viewed the design day as the controlling factor in establishing a reliable supply portfolio (id.). The Company noted that the design-year standard represents the point at which equilibrium is established between the higher cost of reliability and the societal cost of increased outages (id.). New England Gas used scenario analyses to bound the range of possible standards. The Company indicated that its analysis shows that the selected design year standard falls within the optimal planning standard (id. at 1and Sch. 2-6).

In valuing the societal cost of increased outages, the Company analyzed lost production for commercial and industrial customers ("C&I"). The Company explained that it utilized

local available gross product data, the Gross Domestic Product statistics (refined to represent the Company's customers in Bristol County)[5] and employment census data to derive (i) the lost production, and (ii) the benefit of avoiding lost production (id. at 12). Using employment as a proxy, the goods and services in the Company's service territory were estimated at $24.6 million per day (id. at 14). Most industrial-size businesses within the Company's service territory are connected into its distribution system. Thus, the Company calculated that if all of the Company's non-residential service were curtailed, the societal cost would be $24.1 million per day (id.). The Company maintains a curtailment plan but stated that, in practice, it could not selectively curtail the entire commercial and industrial sector to service the residential sector (id.). By curtailing only medium and large customers, lost production would be equivalent to 69 percent of the total commercial and industrial load (id.).

b. Analysis and Findings

In 1986, the Energy Facilities Siting Council[6] notified gas companies that it would place renewed emphasis on design criteria "to ensure that those criteria bear a reasonable relationship to design conditions that are likely to be encountered." 1986 Gas Generic Order, 14 DOMSC 95, at 96-97, 104-105 (1986) ("1986 Gas Generic Order"). The Department finds

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[5] There were some adjustments made to the Bristol County data because the Company does not serve all of Bristol County and it serves Plainville, which is located in Norfolk County (Exh. NEG-1, at 13).

[6] Effective September 1, 1992, the Energy Facilities Siting Council was renamed the Energy Facilities Siting Board. St. 1992, c. 141, §§ 9, 55.

that New England Gas has complied with Department precedent in this area by using a probabilistic analysis in establishing its design year standard.

The Department notes that the Company conducted a cost-benefit analysis to compare the benefit of maintaining an adequate supply under different planning standards to the probability-weighted societal cost of service curtailment. The Company's resource plan allows the Company to meet different demand levels, subject to the additional costs associated with incremental commodity requirements. In D.T.E. 01-47, at 9 and D.T.E. 99-26, at 9, the Department concluded that a one-in-30 design year standard is accurate and cost effective.[7]

The Department finds that the analysis used by the Company to support its design year standard contains a deficiency that appears also to affect its design day analysis. The Company developed its design year standard by calculating the lost production of C&I customers. At issue is the introduction of a new criterion that assumes that the Company's responsibilities expand beyond meeting weather-driven demand. The concern here is that the Company expects that it would be responsible for lost production. New England Gas has not provided justification for this assumption. To the contrary, the Company's Terms and Conditions regarding Force Majeure and Limitations of Liability state that:

> The Company shall be liable only for direct damages resulting from the Company's conduct of business when the Company, its employees or agents have acted in a negligent or intentionally wrongful manner. In no event shall the Company be liable to any party for any indirect, consequential, or special

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[7] For each of the following companies, the Design Year/Design Day is as follows: KeySpan Energy Delivery New England (1:37/1:46); NSTAR Gas Company (1:33/1:50); Bay State Gas Company (1:25/1:25); Berkshire Gas Company (1:30/1:20); Fitchburg Gas and Electric Light Company (1:30/1:30).

> damages, whether arising in tort, contract or otherwise, by reason of any services performed, or undertaken to be performed, or actions taken by the Company, or its agents or employees, under the Schedule of Rates or in accordance with or required by law, including, without limitation, termination of the Customer's service. (Terms and Conditions § 20.2).

Direct damages are damages such as follow immediately upon the act done, whereas consequential damages are the necessary and connected effect of the wrongful act, flowing from some of its consequences or results, though to some extent depending on other circumstances. Delano Growers' Co-op. Winery v. Supreme Wine Co., Inc., 393 Mass. 666 (1985). Lost production would not qualify as a direct damage, it would be treated as a consequential damage to an outage or curtailment of service. Thus, because the Company would not be responsible for lost production, it would not be appropriate to plan its resources for such a circumstance. Historically, local distribution companies ("LDCs") incorporate costs such as the cost of relighting pilots, cost of freeze-ups, and other repair costs as inputs to the development of design criteria. The Department recognizes a tension between the competing goals of safeguarding reliable, uninterrupted gas service, which may lead LDCs to procure resources in excess of their peak requirement, and ensuring that the LDCs' costs are low. LDCs should continually strive to optimize their resource portfolios and firm load requirements in a manner that promotes safe, reliable, low cost and valuable service.

Therefore, the Department finds that the Company's design year standard is reviewable, reliable, but not appropriate. For the Department to approve the Company's design year standard in its next forecast and supply plan, the Company must either: (1) remove lost production as one of the controlling factors of establishing the design day

standard or (2) present justification for inclusion of lost production in its C&I sectors in developing design standards.

4. Design Day Standard

a. Description

New England Gas's design day standard establishes the minimum deliverability that the Company must have available on the coldest day for which it is expected to plan. The Company's design day standard was based upon a probabilistic and cost/benefit analysis similar to that used by the Company to develop its design year (Exh. DTE-2-52). As a result of using the average and standard deviation of the peak day observed over the last 20 years as the distribution function, the Company selected a design day standard of 74.4 EDD, representing a probability of occurrence of one in 51 years (id.).

The Company explained that under extreme weather conditions, it is possible that actual customer loads would exceed the planning load (Exh. DTE-2-54). However, the existence of a single, very cold day may not cause loads to exceed the level for which the Company plans, because the prior day and the second prior day temperatures have a significant impact on the design day's load (id.). The Company noted that if actual loads exceeded those expected on a design day, New England Gas will initiate a curtailment plan to address the priorities of individual customers and classes when firm service can no longer be provided to all (id.).

The Company indicated that the benefit of additional reliability on a design day is estimated as the avoided societal costs of curtailing non-residential customers (Exh. NEG-1, at 17). According to the Company, the direct costs of an outage to the non-residential sector

consist primarily of: (1) lost production; (2) the possible costs to repair damage resulting from the outage; and (3) the cost to re-light pilot lights (id.). The Company calculates that the interruption of medium and large C&I customers would have a societal cost of $16.5 million per day (Exh. NEG-1 at 17). The Company stated the analysis excluded the benefit of avoiding customer repair costs and the costs to relight pilot lights (id. at 18).

b. Analysis and Findings

The Department reviews design criteria to ensure that there is a reasonable relationship between forecast and actual conditions. See 1986 Gas Generic Order at 97. Specifically, the Department evaluates how and why a company selects particular design weather criteria and the effect of the design standard on the reliability of a company's forecast and the cost of its supply plan (id.).

The Department finds that New England Gas has performed an adequate analysis of the cost of unserved demand, and has reasonably quantified the actual costs associated with planning to different standards in determining its design day standard. As with our concern regarding the design year standard, the Department notes that despite the Company's limitation of liability as clearly stated in Section 20.2 of New England Gas's Terms and Conditions, the Company has selected to incorporate lost production as a cost in developing the design day standard.

The Department notes that the issue is whether the Company has established a reviewable design day standard that promotes both cost-effective and reliable resource

planning. The Department finds that the Company standard is excessive, calling into question whether it provides a sound basis for resource planning decisions.

Therefore, the Department finds that the Company's design day standard is reviewable, reliable, but not appropriate. For the Department to approve the Company's design day standard in its next forecast and supply plan, the Company must either: (1) remove lost productivity as one of the controlling factors of establishing the design day standard; or (2) provide justification for inclusion of lost production of C&I customers in developing design standards.

5. Cold Snap Planning Standard

a. Description

The Company noted that its ability to respond to a cold snap is constrained, in part, by New England Gas's local storage capacity and by its ability to receive liquid propane-air and liquified natural gas ("LNG") deliveries (Exh. NEG-1, at 18). In order to provide a true test of the Company's ability to meet the requirements of a cold snap, New England Gas identified the ten consecutive days with the greatest total heating degree days (id. at 19). The Company indicated the maximum heating degree ten-day-total of 668 degree days observed during the period of February 9 through February 18, 1979 (id.). In the cold snap, the heating degree days ranged from 58 to 73 each day (id.). The Company stated that in order to model the worst case scenario, it included only one weekend in the ten-day cold snap to determine the cold-snap planning standard (id.).

Using the econometric specification to predict loads, the Company's daily sendout requirements ranged from a low of 58,131 million British thermal units ("MMBtu") per day in 2004 to a maximum level of 71,941 MMBtu/day in 2008 (Exh. DTE-2-11). The regression results from the daily sendout analysis and the ten-day total sendout requirement is shown as 645,682 MMBtu in 2004 and 657,314 MMBtu in 2008 (id.).

b. Analysis and Findings

The Department finds that New England Gas complied with the previous North Attleboro order to use a database of 20 years of data. D.T.E. 01-47, at 9. The Company provided tables and analysis similar to those presented in its design year and design day plans. These tables indicate that New England Gas has adequate supplies to meet its firm sendout requirements during a prolonged cold snap (Exh. DTE-2-11). The Department, therefore, finds the cold-snap planning standard presented by New England Gas to be reviewable, appropriate, and reliable.

6. Conclusions on Planning Standards

In previous sections of this Order, the Department has found that : (1) the weather database used by the Company is reviewable, appropriate, and reliable; (2) the Company's normal year planning standard is reviewable, appropriate, and reliable; (3) the Company's design year planning standard is reviewable, reliable, but not appropriate; (4) the Company's design day planning standard is reviewable, reliable, but not appropriate; and (5) the Company's cold-snap planning standard is reviewable, appropriate, and reliable.

D. Forecasting Methods

1. Forecasting Model

The Company combined the long-range forecast and supply plan for the Fall River and North Attleboro service areas of the New England Gas Company covering a five-year forecast period of 2003/2004 through 2007/2008 (Exh. NEG-1, at 1).[8] New England Gas estimated loads under normal and design-year conditions for the five-year forecast period using an econometric technique involving three stages (id. at 5). First, the Company projected firm sales over the forecast period (id.). Second, firm sendout requirements were developed by summing firm sales, firm transportation, and miscellaneous-use gas (id.). Third, the Company developed a forecast of the "Planning Load"[9] (id. at 5, 6). The Planning Load forms the basis of the Company's production planning requirements over the forecast period (id. at 6). For the purpose of developing the Planning Load, the projected sales were reduced by demand-side management ("DSM") projections taken from the Company's 2003–2007 Annual Conservation

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[8] The demand forecast was prepared by summing the historical demand for the two systems and modeling the combined total (Exh. DTE-2-23).

[9] The Planning Load represents firm sendout less (1) capacity-exempt transportation volumes and (2) new transportation loads (Exh. NEG-1, at 20). The Company stated that capacity-exempt transportation loads have been declining over the past few years and this trend is expected to continue over the next few years due to the general decline in local industrial/manufacturing segments, particularly in the textile industry (id. at 26). According to the Company, the addition of new transportation loads will offset the loss of loads associated with capacity-exempt transportation customers, resulting in no net change in the gas volumes that are excluded from the Company's Planning Load (id.).

Projections (id. at 26).[10] In addition, New England Gas performed a sensitivity analysis using a low-case and high-case scenario (id. at 28).[11]

2. Econometric Load Forecasting

a. Description

The Company used quarterly historical data series for the period January 1992 through August 2003 (Exh. NEG-1, at 24). The Company used econometric analysis to forecast the number of customers and the usage levels (id. at 25). The final sales projections were developed by multiplying the number of customers by usage level (id.). The Company stated that the projections cover the following four customer classes: Residential Regular, Residential Heating, C&I Low-Load Factor, and C&I High-Load Factor (id.). In addition to the four classes, Company Use was also forecasted (id.).[12] New England Gas collected, compiled, and analyzed the Company's operating statistics and other external demographic and

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[10] The Company forecasts an increase in DSM savings, under normal weather conditions, from 16,449 MMBTU in 2003/2004 to 44,915 MMBTU in 2007/2008 (Exh. NEG-1, at Sch. 3-1).

[11] The low-case scenario assumed zero growth in population, personal income and employment, a 10 percent increase in gas prices, and a 10 percent decrease in oil prices over those used in the base-case scenario (Exh. NEG-1, at 28). The high-case scenario assumed doubled growth in population, personal income, employment, a 10 percent decrease in gas prices, and a 10 percent increase in oil prices over those used in the base-case scenario (id.).

[12] Company-used gas is natural gas consumed by a gas LDC, e.g., fuel for compressor stations, etc. Company-used gas does not include interdepartmental sales from the gas department of a combination utility to any other department.

economic data to describe the Company's service territory (Exh. NEG-1, Vol. II at E-2).[13] The Company used Bristol County data as a source of independent variables to forecast loads for both Fall River and North Attleboro service territories (Exh. DTE-2-13).[14] The focus of the analysis centered around the following variables: population, households, employment, weather, per capita and total personal income, energy prices and price deflator (Exh. NEG-1, Vol. II).

Regarding the Company's modeling strategy, New England Gas stated that it used the direct-selection approach (Exh. NEG-1, at 25). In that approach, a hypothesis is developed based on a list of the relevant independent variables (id.). Using an iterative process, variables are added or removed until all remaining variables are statistically significant and reasonable (id.). Finally, the forecast was generated and an ex post forecast was calculated and used to assess the model's robustness (Exh. DTE-3-13).

New England Gas asserted that it evaluated the regression models by reviewing the adjusted R-squared, t-statistic, F-statistic, sign of estimates, and the Durbin-Watson statistic

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[13] Primary data sources included both state and national level governmental agencies as well as historical series obtained from the Regional Economic Information Service (Exh. NEG-1, Vol. II at E-2).

[14] The Company indicated that a small portion of the North Attleboro service territory, namely the town of Plainville, is located outside of Bristol County (Exh. DTE-2-13). Because this town is in close proximity to Bristol County and because it represents only 799 of the 53,395 customers served by New England Gas, the Company determined that Bristol County data continued to be an appropriate proxy for the combined service territory (id.).

(Exhs. NEG-1, Vol. II; DTE-2-28). The Durbin-Watson test detected serial autocorrelation[15] in most forecast models[16] (Exhs. DTE-3-1; DTE-2-30; DTE-2-32; DTE-2-35; DTE-2-37; DTE 2-38; DTE-2-40; DTE-2-41). According to the Company, the presence of serial autocorrelation was not resolved despite numerous attempts (Exh. DTE-2-43).[17] New England Gas indicated that the Company included an empirical correction factor[18] in the forecast to compensate for the impact of serial autocorrelation (id.). According to the Company, the empirical correction factor eliminates the further need to adjust the forecast results (Exh. DTE 3-5). New England Gas maintained that the proposed models provide a reasonable and reliable forecast (Exhs. DTE 2-30; DTE-2-32; DTE-2-35; DTE-2-37; DTE 2-40; DTE 2-41). Further, the Company indicated that except for the presence of serial correlation, the statistics of the forecast models are excellent (Exh. DTE-2-38; DTE-2-40; DTE-2-41).

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15 A serial autocorrelation problem in a regression equation occurs when the errors corresponding to different observations are correlated and are not independent from each other. It is common for time-series observations on economic variables to be correlated over time.

16 Sendout and Sales Models (Exh. DTE-3-1); Residential Regular Customer Model (Exh. DTE-2-30); Residential Regular usage Model (Exh. DTE-2-32); Residential Heating usage Model (Exh. DTE-2-35); C&I low-load factor customer Model (Exh. DTE-2-37); C&I low-load factor usage Model (Exh. DTE-2-38); C&I high-load factor customer Model (Exh. DTE-2-40); and C&I high-load factor usage Model (Exh. DTE-2-41).

17 The Company asserted that the econometric software used to estimate the forecast models did not provide a convenient means to directly calculate a correction for first order serial autocorrelation (Exh. DTE-3-4).

18 The Company stated that the empirical correction factor consisted of subtracting the average of the same-quarter residuals over the last three years prior to the commencement of the study, from the forecast's predictions (Exh. DTE-2-43).

Moreover, adjusted R-squared ranged from 60.8 percent for "C&I High Load Factor Usage" model to 99.3 percent for "Residential Heating Usage" model (Exh. NEG-1, Vol. II). As a general rule, the Company used a t-statistic of two or more to evaluate the statistical significance of the explanatory variables (Exh. DTE 2-28).

The results of the Company's demand forecast show that the Company Planning Load is expected to increase from 7,843,912 Decatherms ("Dth") to 7,875,294 Dth (or 0.40 percent) under normal weather conditions, and from 8,469,204 Dth to 8,490,972 Dth (or 0.25 percent) under design weather conditions over the forecast period (2003/2004-2007/2008) (Exh. NEG-1, Sch. 4-5 REV). The design day forecast shows an increase from 76,828 Dth to 78,039 Dth over the forecast period (2003/2004-2007/2008) (id.).

In response to Department issued discovery, the Company reestimated the forecast models using a Cochrane-Orcutt[19] method to correct for serial autocorrelation whenever the Durbin-Watson statistic seemed unreasonable (Exhs. DTE-3-1; DTE-2-30; DTE-2-32; DTE-2-35; DTE-2-37; DTE-2-38; DTE-2-40; DTE-2-41). Adjusted R-squared ranged from 77.8 percent for C&I High Load Factor Usage model to 98.9 percent for C&I Low Load Factor Usage model (RR-DTE-2). Further, the Company used forecast comparisons with

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[19] The Cochrane-Orcutt iterative least squares procedure is a standard econometric technique used to address first order serial autocorrelation. The average correlation between residuals of consecutive periods is estimated and incorporated in the regression model by transforming the dependent and independent variables of the forecast model. The coefficients of the independent variables are reestimated in an iterative fashion until the serial correlation in the residuals is removed.

actual normal sendout data from November 1997 to October 2002 to evaluate the predictive ability of the forecasts (Exh. DTE-3-13).[20]

The results of the Company's demand forecast, using the reestimated forecast models, show that the Company Planning Load is expected to increase from 7,909,981 Dth to 7,973,885 Dth (or 0.80 percent) under normal weather conditions, and from 8,517,265 Dth to 8,574,764 Dth (or 0.67 percent) under design weather conditions over the forecast period (2003/2004-2007/2008) (Exh. DTE-4-1 REV). The design day forecast shows an increase from 75,005 Dth to 74,502 Dth over the forecast period (2003/2004-2007/2008) (id.).

New England Gas stated that the use of the Cochrane-Orcutt method eliminated or reduced the serial autocorrelation problem (Exhs. DTE-2-32; DTE-2-35; DTE-2-37; DTE 2-38; DTE-2-40). Further, the Company stated that it recognized that the consequences of ignoring the serial autocorrelation problem in the forecast models would: (1) render the R-squared, standard errors, interval estimates and, consequently, hypothesis tests invalid; and (2) bias forecasting accuracy (Exh. DTE-3-5). However, the Company indicated that ignoring serial autocorrelation will not bias the estimates of the coefficients of the independent

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[20] The Company computed the mean absolute deviation (average of the absolute values of the forecast errors) ("MAD") (Exh. DTE-3-13). The resulting MAD from the reestimated forecast models was 39,391 Dth versus 40,280 Dth from the originally estimated forecast models (id.). According to the Company, the difference, amounting to two percent, represents a very minor improvement (id.).

variables (Exh. DTE-3-5). Consequently, the Company stated that bias appears to be minor and does not significantly affect the results of the forecast (id.).[21]

The Company stated that the forecast results from applying the Cochrane-Orcutt method are deficient, due primarily to the large residuals observed in the last historic period (RR-DTE-1). Further, New England Gas claimed that reliance on the purely statistical Cochrane-Orcutt transformation technique could result in a requirement for additional resources that the Company believes are unnecessary and that are beyond the level that was found adequate to serve the severe weather conditions observed this past winter (id.).

b. Analysis and Findings

In North Attleboro's last forecast and supply plan case, the Department directed the Company, in its next filing, to identify and use socioeconomic and demographic data that reflect more accurately the structure of the economy of the Company's service territory. D.T.E. 01-47, at 18-19. In the present filing, the Company used Bristol County data to develop forecast loads for the combined Fall River and North Attleboro service territories (Exh. DTE-2-13). The Department acknowledges that only 799 of the 53,395 (or 1.5 percent) customers served by New England Gas Company are outside the Bristol County, and therefore, the Department finds that the Bristol County data reflect the socio-economics and demographics of the Company's service territory.

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[21] The Company stated that the reestimated forecast models produce winter sales estimates that exceed the Company's forecast by approximately 1.75 percent while the summer differences are insignificant (Exh. DTE-4-1 REV). The Company maintains that, this minimal difference does not warrant any changes to the originally filed Load Forecast and Resource Plan (id.)

The forecasting model developed by New England Gas incorporates sufficient detail to allow full understanding of the methodology. The Company: (1) developed a combined forecast for both Fall River and North Attleboro service territories; (2) generated econometric forecasts in terms of number of customers and usage; (3) prepared separate gas models for residential heating, residential general, C&I Low Load Factor, and C&I High Load Factor groups of customers; (4) conducted a sensitivity analysis in its forecast; and (5) analyzed the predictive ability of its forecast model. The Company detected a serial autocorrelation problem in most of the forecast models (Exh. DTE-4-1-REV; RR-DTE-1).

The Department reviewed and evaluated two forecast models. We note that the two models are the results of addressing serial autocorrelation in two different fashions. As noted in footnote 16 and the accompanying text above, the Company applied a correction factor to the forecast results to mitigate the effects of serial autocorrelation. Then, in response to the Department's inquiry, the Company corrected serial autocorrelation by reestimating the forecast models using the Cochrane-Orcutt iterative least squares method, one of the standard methods available in the econometric literature to assess serial autocorrelation (RR-DTE-1 and see footnote 19 and accompanying text above).

The Department notes that by using a correction factor in the Company's forecast models, New England Gas addressed serial autocorrelation by calibrating the forecast results instead of correcting the forecast models themselves (Exh. DTE-4-1REV). The Department finds that calibrating the forecast results does not correct serial autocorrelation and, therefore, the Company's forecast models fail to produce valid statistics (e.g., standard errors, interval

estimates, hypothesis test, and adjusted R-squared). Because the statistics are used to assess the robustness and reliability of projection models, the Department finds that it cannot adequately evaluate the Company's forecasting model based on invalid statistics. The Department acknowledges that serial autocorrelation will not bias the estimates of the coefficients of the independent variables. However, the Department finds that the variances of the estimates are not the most efficient,[22] are larger than they could have been, and, therefore, forecast results may be affected significantly. Thus, reliable inferences cannot be made based on the regression results.

In addition, serial autocorrelation problems occur when the residuals (or component of behavior of the dependent variable not explained by the independent variables) of the forecast models follow a pattern, instead of being random. Thus, the Department finds that calibrating the forecast results, and not correcting the model for serial autocorrelation, results in a fault in the modeling because the pattern followed by the error term should have been captured and incorporated into the model to further explain the behavior of the dependent variable (e.g., number of customers or usage levels).

Further, the Department notes that serial autocorrelation is a typical problem that occurs when modeling time series data and that most LDCs have to address this modeling inefficiency when preparing their forecast and supply plans. See Fitchburg Gas and Electric Light Company, D.T.E. 03-52, at 11-12 (2004); NSTAR Gas Company, D.T.E. 02-12,

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[22] The variance of an estimate of any independent variable measures the precision of the estimate. In a probabilistic sense, the variance measures by how much, in a repeated sampling, the estimates of the independent variables could vary.

at 24-25 (2003); D.T.E. 02-75, at 9-11 (2004). The Department finds that there is no justification for the Company to address the serial autocorrelation problem by calibrating results, instead of assessing and correcting the problem with one of the standard methods available in the current econometric literature and that are widely used by other LDCs in Massachusetts. D.T.E. 03-52, at 11-12. Therefore, the Department finds that the projection method, which incorporates a correction factor to mitigate the effects of serial autocorrelation, is reviewable, but not appropriate and not reliable.

The Department notes that correcting the forecast models for serial autocorrelation using the Cochrane-Orcutt method will produce valid statistics that can be used to evaluate the forecast models. The Department finds that the Company has sufficiently documented its methodology for the demand forecast. We find that the Company developed its forecast based on econometric models that are suitable for the size and the nature of the Company. Additionally, the Department notes that the econometric methods employed by the Company are proven techniques and used extensively in the industry by LDCs.

The Company stated that the forecast results using Cochrane-Orcutt method are deficient due to the large residuals observed in the last historic period (RR-DTE-1). In addition, New England Gas stated that the forecast using Cochrane-Orcutt method is not reliable and could result in a requirement for additional resources that the Company believes are unnecessary and beyond the level that was found adequate to serve the severe conditions observed this past winter (id.). The Department disagrees with the Company that addressing serial autocorrelation using Cochrane-Orcutt methods will lead to unreliable results. The

Cochrane–Orcutt method is a proven methodology that is used extensively in the industry. See e.g. D.T.E. 02-17 (Tr. at 28). Furthermore, the Department notes that the forecast, which incorporates the Cochrane-Orcutt method, corrects the effects of serial autocorrelation. Based on our previous findings in Sections II.B.4 and II.B.5, we find that the revised forecast, which incorporates the Cochrane-Orcutt method, is reviewable, appropriate and reliable. To further ensure the forecasting accuracy of its normal and design weather forecasts, the Department directs the Company to submit, in its next filing, a measure of forecasting accuracy that includes the backcast of dependent variables for the last five periods of the historical data set, both under normal and design weather conditions.

3. Transportation Forecasts

a. Description

The Company asserted that it held discussions with marketers, transportation customers and sales customers and concluded that no significant migration from sales to transportation service was expected over the forecast period (Exh. NEG-1, at 26).[23] Therefore, the Company assumes that the number of C&I Low Load Factor and C&I High Load Factor firm transportation customers over the forecast period will remain constant at the August 2003

[23] The Company has a marketing group that deals with the largest customers on a one-on-one basis and a transportation and billing group that deals directly with the marketers (Tr. at 16-17). The Company's expectation is that the current level of transportation services will continue with some normal ebb and flow of customers switching to and from transportation service over the forecast period, with no net gain or loss of customers (Exh. DTE-2-24).

level[24], i.e., migration from sales service to transportation service would be offset by reverse migration (Exh. DTE-2-18).[25] Further, the Company assumes that the C&I Low Load Factor and C&I High Load Factor firm transportation usage over the forecast period will grow at the same rate as the prior twelve-month period (Exh. DTE-2-19). New England Gas stated that the Company experienced a negative growth rate that resulted in a forecast of decreasing transportation volumes from 1,140 million cubic feet ("MMcf") in the split year 2003/2004 to 1,024 MMcf in the split year 2007/2008 (Exhs. DTE-2-19; DTE-4-1). The Company indicated that it could not develop acceptable econometric models to forecast transportation customers because of the relatively short history of transportation service, and because of the changing utility regulations affecting transportation service over the historical period (Exh. DTE-2-25).

b. Analysis and Findings

In Fall River's most recently approved forecast and supply plan, the Department directed the Company, in its next filing, to identify any additional migration to firm transportation service, and evaluate how changes in the firm transportation market may affect the Company's sendout forecast. D.T.E. 99-26, at 15. New England Gas indicated that it expects the number of firm transportation customers to remain constant throughout the forecast

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[24] The Company reported 53 C&I High Load Factor firm transportation customers and 115 C&I Low Load Factor firm transportation customers (Exh. DTE-4-1).

[25] The Company did not perform a specific forecast for the reverse migration of firm transportation customers (Exh. DTE-2-24). According to the Company, there is a continual variation in the number of customers taking sales and transportation services, and many of these variations have offsetting effects (id.).

period (Exh. NEG-1, at 26). Based on the information available to the Company at the time New England Gas prepared its current filing, the Department finds that New England Gas's analysis of transportation services is reasonable. Therefore, the Department finds that the Company's method of determining its transportation volumes and number of firm transportation customers is reviewable, appropriate, and reliable.

III. ANALYSIS OF THE SUPPLY PLAN

A. Standard of Review

The Department is required to ensure "a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost." G.L. c. 164, § 69I. In fulfilling this mandate, the Department reviews a gas company's supply planning process and the two major aspects of every utility's supply plan: adequacy and cost.[26] Commonwealth Gas Company, D.P.U. 92-159, at 53 (1995); Colonial Gas Company, D.P.U. 93-13, at 49-50 (1995); 1992 Boston Gas Decision at 201.

The Department reviews a gas company's five-year supply plan to determine whether the plan is adequate to meet projected normal-year, design-year, design-day, and cold-snap firm sendout requirements. 1992 Boston Gas Decision at 201. The Department's review of reliability, another necessary element of a gas company's supply plan, is included in the Department's consideration of adequacy. See , D.T.E. 99-26, at 18; D.P.U. 93-13, at 50, n.22; 1992 Boston Gas Decision at 201, n.87. In order to establish adequacy, a gas company

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[26] G.L. c. 164, § 69I also directs the Department to balance cost considerations with environmental impacts in ensuring that the Commonwealth has a necessary supply of energy. D.P.U. 96-18, at 31; D.P.U. 92-159, at 53; D.P.U. 93-13 at 50.

must demonstrate that it has an identified set of resources that meet its projected sendout under a reasonable range of contingencies. 1992 Boston Gas Decision at 201, n.87. If a company cannot establish that it has an identified set of resources which meet sendout requirements under a reasonable set of contingencies, the company must then demonstrate that it has an action plan which meets projected sendout in the event that the identified resources will not be available when expected. D.P.U. 96-18, at 31; D.P.U. 92-159, at 54; D.P.U. 93-13, at 50.

In its review of a gas company's supply plan, the Department reviews a company's overall supply planning process. D.P.U. 92-159, at 53. An appropriate supply planning process is essential to the development of an adequate, low-cost, and low environmental impact resource plan. Id. Pursuant to this standard, a gas company must establish that its supply planning process enables it to (1) identify and evaluate a full range of supply options, and (2) compare all options including DSM on an equal footing. D.P.U. 96-18, at 31; D.P.U. 92-159, at 54; D.P.U. 93-13, at 51; 1992 Boston Gas Decision at 202.

Finally, the Department reviews whether a gas company's five-year supply plan minimizes cost. 1992 Boston Gas Decision at 203. A least-cost supply plan is one that minimizes costs subject to trade-offs with adequacy and environmental impact. D.P.U. 92-159, at 55; D.P.U. 93-13, at 51-52; 1992 Boston Gas Decision at 203. Here, a gas company must establish that application of its supply planning process has resulted in the addition of resource options that contribute to a least-cost plan. D.P.U. 92-159, at 55.

B. Previous Supply Plan Review

The Department approved the Company's most recent supply plans in D.T.E. 01-47 and D.T.E. 99-26. The Department directed North Attleboro to (1) provide an action plan to indicate whether it can obtain supplies to meet its firm sendout requirements in the event existing or new supplies become unavailable; and (2) submit a DSM plan by May 31, 2002. D.T.E. 01-47, at 29, 34. The Department approved Fall River's supply plan without issuing any specific directives. D.T.E. 99-26, at 34-35.

C. Base Case Supply Plan

In this section, the Department reviews the Company's supply plan and identifies elements that represent potential contingencies affecting the adequacy of supply or which potentially affect the cost of the supply plan. The Department reviews the adequacy of the Company's supply plan, the Company's supply planning process, and the cost of the Company's supply plan.

1. Supply-Side Resources

The Company stated that it had entered into a supply agreement with Conoco Phillips ("COP"), which will provide the necessary gas supplies to meet customer requirements for the 2004/2005 winter season for its entire service area (Exh. NEG-1, at 32-33). The Company will purchase gas supply at market indices and least-cost dispatch (id.). COP will have rights to manage storage and non-assignable transportation, and will compensate the Company for the value of the capacity used by COP when it is not being used to service the Company's requirements (id.).

The Company terminated a contract with Distrigas of Massachusetts, LLC ("DOMAC"), which will be replaced with supplies transported on the Hubline[27] to the Company's citygate, with a minimal contract remaining with DOMAC to provide LNG refill (id.). The Company states that all pipeline and storage entitlements are delivered on the Algonquin Gas Transmission Company's ("Algonquin") pipeline system, with city-gate deliveries via Algonquin's G system (id.). The Company has capacity rights totaling 34,505 MMBtus/day to meet its design day requirements (id.).

The Company is in the process of consolidating the transportation and storage contracts of Fall River and North Attleboro (Tr. at 14-15). The Company maintains underground storage through Texas Eastern Transmission Corporation, Dominion Resources, Inc. and National Fuel Gas Company (Exh. NEG-1, at 34).

The Company stated that it maintains LNG and propane storage facilities in its Fall River service area of 25,981 MMBtus/day (id.). These facilities are necessary to meet design day requirements (id.).[28]

2. Demand-Side Management

The Company stated that its Fall River service area DSM programs were established in 1995 and are offered to both residential and C&I customers (Exh. NEG-1, at 22). These

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[27] The Hubline is Algonquin Gas Transmission Company's offshore natural gas pipeline extending from Beverly to Weymouth, Massachusetts.

[28] North Attleboro did not have access to on-line peaking resources previous to the consolidation of the two service areas (Exh. NEG-1, at 34).

programs operate under a settlement agreement approved by the Department in Fall River Gas Company, D.T.E. 01–30 (id.).

In New England Gas Company, D.T.E. 02-36 (2003), the Department approved a proposal to offer residential and C&I energy efficiency and market-transformation programs in the North Attleboro service area, modeled after those approved for the Fall River service area (id.). The combined load reductions realized from both the Fall River and North Attleboro service areas ranged from 3,846 MMBtu for the 2004-2005 season to 7,510MMBtu in the 2007/2008 season (id. at 5, Sch. 3-1).

D. Adequacy of the Supply Plan

1. Normal and Design Year Adequacy

a. Description

The Company submitted its plans for meeting the combined forecast normal year and design year sendout requirements, for both its Fall River and North Attleboro service areas, throughout the forecast period (Exh. NEG-1, Schs. 5-6, Tables G22N, G22D). The Company plans to meet its normal year and design year heating season requirements using long-haul pipeline resources, underground storage, DSM, LNG, and propane (Exh. NEG-1, at 33). The Company anticipates that the discontinued DOMAC contract will be replaced by supplies from COP, transported to the Company's citygate by the Hubline (id.).

The Company forecasts normal year firm sendout requirements of 5,230,718 MMBtu for the 2004/2005 heating season and 5,239,940 MMBtu for the 2007/2008 heating season (Exh. NEG-1, Sch. 5-6, Table G22N) (id. at 29). The Company forecasts that design year

firm sendout requirements will increase from 5,948,721MMBtu in 2004/2005 heating season to 6,021,023 MMBtu in the 2007/2008 heating season (id., Sch. 5-6, Table G22D).

b. Analysis and Findings

As noted previously, the Department has found New England Gas's normal and cold snap forecast to be reviewable, appropriate, and reliable, and the Company's design day and design year forecasts to be reviewable, reliable, but not appropriate (see Section II.C.6 above). Based on the reasonableness of the sendout and supply tables, the Company has demonstrated that it has adequate supplies to meet its forecast sendout requirements under normal, design, and cold snap conditions throughout the forecast period (Exh. NEG-1, Schs. 5-7,and Table G23, at 1). Accordingly, the Department finds that New England Gas has established that the Company has adequate supplies to meet its projected sendout requirements under a reasonable range of contingencies throughout the forecast period.

2. Design Day Adequacy

a. Description

The Company presented a combined table for meeting its forecasted design day sendout requirements throughout the forecast period for the Fall River and North Attleboro service areas (Exh. NEG-1, Schs. 5-7, and Table G23, at 1). The Company plans to meet its design day needs through existing firm pipeline supplies, underground storage, DSM, LNG, propane and supply agreements (id.). The Company forecasts that design day firm sendout requirements will increase from 71,014 MMBtu in the 2004/2005 heating season, to 71,842MMBtu in the 2007/2008 heating season (id.).

b. Analysis and Findings

New England Gas presented supply plans for meeting its forecast design day sendout requirements throughout the forecast period. As noted previously, the Department found the Company's design day forecast to be reviewable, reliable, but not appropriate (see Section II.C.6 above). Based on this finding and the reasonableness of the data in the sendout and supply tables, the Department finds that New England Gas has demonstrated that it has adequate supplies and facilities to meet forecast sendout requirements under the design day conditions throughout the forecast period (Exh. NEG-1, Schs. 5-7, and Table G23, at 1).

3. Cold Snap Adequacy

a. Description

The Company determined that in order to meet its demand during an extreme cold snap, it would have to be able to serve the total peak sendout requirement of 657,314 MMBtu (Exh. DTE-2-11 REV at 2, 4). To meet this extended period of peak demand, New England Gas could dispatch its portfolio of pipeline supplies, storage volumes, LNG and propane from its production facilities (id.).

b. Analysis and Findings

The record demonstrates that the Company's supply resources would support peak demand during an extreme cold snap (id.). Based on the Company's analysis, the Department finds that the Company has demonstrated that it has adequate supplies to meet its firm sendout requirements during a cold snap.

4. Conclusions on the Adequacy of the Supply Plan

The Department finds that: (1) the normal year and design year supply plans are adequate to meet the Company's forecasted sendout requirements throughout the forecast period; (2) the Company has demonstrated that it has adequate supplies and facilities to meet forecasted sendout requirements under design day conditions throughout the forecast period; and (3) the Company has demonstrated that it has adequate supplies to meet its firm sendout requirements during a cold snap. Based on these subsidiary findings, the Department finds the Company, with its combined Fall River and North Attleboro services areas, has established that it has identified adequate resources to meet its firm sendout requirements under a reasonable range of contingencies throughout the forecast period.

E. Supply Planning Process

1. Standard of Review

The Department has determined that a supply planning process is critical in enabling a utility company to formulate a resource plan that achieves an adequate, least-cost and low environmental impact supply for its customers. Berkshire Gas Company, D.P.U. 94-14, at 36 (1994); Colonial Gas Company, D.P.U. 93-13, at 70 (1995); 1992 Boston Gas Decision at 223; Boston Gas Company, 19 DOMSC 332, at 388 (1990) ("1990 Boston Gas Decision"). The Department has noted that an appropriate supply planning process provides a gas company with an organized method of analyzing options, making decisions, and reevaluating decisions in light of changed circumstances. D.P.U. 94-14, at 36; D.P.U. 93-13, at 70; 1992 Boston

Gas Decision at 223; 1990 Boston Gas Decision at 388. For the Department to determine that a gas company's supply planning process is appropriate, the process must be fully documented. D.P.U. 93-13, at 70; 1992 Boston Gas Decision at 223.

The Department's review of a gas company's process for identifying and evaluating resources focuses on whether the company: (1) has a process for compiling a comprehensive array of resource options -- including pipeline supplies, supplemental supplies, DSM, and other resources; (2) has established appropriate criteria for screening and comparing resources within a particular supply category; (3) has a mechanism in place for comparing all resources, including DSM, on an equal basis, i.e., across resource categories; and (4) has a process that, as a whole, enables the company to achieve an adequate, least-cost, and low environmental impact supply plan. D.P.U. 94-140, at 37; D.P.U. 93-13, at 70; 1992 Boston Gas Decision at 224; 1990 Boston Gas Decision at 54-55.

The Department reviews a gas company's five-year supply plan to determine whether it minimizes cost, subject to trade-offs with adequacy and environmental impact. D.P.U. 94-140, at 37; D.P.U. 93-13, at 88; 1992 Boston Gas Decision at 236. A gas company must establish that the application of its supply planning process, including adequate consideration of DSM and consideration of all resource options on an equal basis, has resulted in the addition of resource options that contribute to a least-cost supply plan. D.P.U. 94-140, at 37; D.P.U. 93-13, at 83; 1992 Boston Gas Decision at 233; Berkshire Gas Company, 14 DOMSC 107, at 115 (1986). As part of this review, the Department requires gas companies to show, at a minimum, that they have completed comprehensive cost studies

comparing the costs of a reasonable range of practical supply alternatives prior to selection of major new resources for their supply plans. D.P.U. 94-140, at 37; D.P.U. 93-13, at 89; 1992 Boston Gas Decision at 236; 1986 Gas Generic Order at 100-102.

2. Identification and Evaluation of Resource Options

a. Supply-Side Resources

i. Description

The Company reports that for the 2003/2004 winter period, it entered into a six-month comprehensive supply arrangement with COP (Exh. NEG-1 at 32). The Company explains that this supply contract was entered into following issuance of a competitive request for proposal ("RFP") process in which bids were solicited from a group of qualified suppliers (id. at 32-33). The Company states that under the contract, COP will provide the necessary commodity supplies to serve both the North Attleboro and Fall River service areas (id.).

The Company explains that over the forecast period, it will be required to make a number of decisions regarding its resource portfolio (id. at 43). In the short term, the Company states that it must enter into new supply contracts beyond the 2003/2004 winter period covered by the COP asset management contract (id.). Over the long-term the Company must evaluate self-managing its supply or conducting an RFP for a long-term asset management agreement (id.).

The Company also states that there may be opportunities to optimize the resource portfolio during the forecast period (id. at 41). The Company claims that when these opportunities arise, it will determine whether new resources are appropriate by using a

decision-tree framework based on the following key factors: (1) actual sales growth; (2) customer migration to transportation service; (3) supply management strategy; (4) capacity contract extensions and terminations; (5) Department decisions on mandatory assignment; and (6) miscellaneous unforseen changes (id. at Sch. 6-1).

The Company further notes that once an additional need is identified through the use of its SENDOUT model,[29] it looks to potential qualified vendors through an RFP process. The vendor review and evaluation process is based on an overall least-cost approach, consistent with the Company's cost and non-cost criteria (Company Brief at 13). The Company contends that it evaluates new resources based on cost and non-price characteristics, including reliability, availability date, diversity of supply, flexibility, financial viability and other relevant criteria that may apply to a supply source (id. at 13-14).

ii. Analysis and Findings

Previously, the Department has endorsed LDC acquisition processes that involved the solicitation of competitive bids from alternative suppliers. Holyoke Gas and Electric Department, D.P.U. 93-191, at 30 (1996); Blackstone Gas Company, D.P.U. 95-15, at 7 (1996); D.P.U. 93-13, at 85-88; Berkshire Gas Company, D.P.U. 94-38, at 10 (1995). In the current proceeding, the Department finds that it is appropriate New England Gas employed an RFP process to identify COP from a group of qualified suppliers (Exh. NEG-1, at 32-33).

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[29] The SENDOUT model is a software tool used to determine least-cost solutions given various variables, including: customer demand, supply contracts, storage facilities, and transportation contracts.

The record also demonstrates the Company's intention to utilize a competitive solicitation process for future asset management agreements and to identify qualified vendors in the event additional supply requirements are necessary (Tr. at 17-19). Accordingly, the Department finds that the Company has developed an appropriate process for identifying a comprehensive array of supply options, and has developed appropriate criteria for screening and comparing supply resources.

b. Demand-Side Management

i. Description

The Company states that DSM initiatives were first introduced to the Fall River service area in 1995 (Exh. NEG-1, at 22). Fall River currently operates a comprehensive energy efficiency and market transformation program pursuant to the settlement agreement approved by the Department in D.T.E. 01-30 (id.). The Company further states that in D.T.E. 02-36, the Department approved the Company's settlement agreement to offer residential and C&I energy efficiency and market transformation programs to its North Attleboro service area (id.). The Company explains that the initiatives included in this settlement were developed based on the programs approved for the Fall River service area, and that it is coordinating its preliminary DSM efforts in North Attleboro with the Fall River service area programs (id. at 22-23).

The Company contends that in accordance with the standards established by the Department in Energy Efficiency Programs, D.T.E. 98-100 (1999), it has quantified the benefits of the potential DSM measures for the purposes of developing the load forecasts in this

supply plan (id. at 23). The Company states that the DSM savings identified in this supply plan are combined for the Fall River and North Attleboro service areas (id.).

ii. Analysis and Findings

By agreeing to offer residential and C&I energy efficiency and market transformation programs to its North Attleboro service area in D.T.E. 02-36, the Company complied with the Department's directive to issue a DSM program plan by May 31, 2002. D.T.E. 01-47, at 34. Furthermore, by quantifying the benefits of potential DSM measures for the purposes of developing the load forecasts in this supply plan, the Company has successfully integrated DSM opportunities into the resource planning process (Exh. NEG-1, Sch. 3-1). The Department finds that the Company has formulated an appropriate process for identifying a comprehensive array of DSM options and has developed appropriate criteria for screening and comparing DSM resources.

3. Consideration of all Resources on an Equal Basis

a. Description

The Company states that it uses the SENDOUT linear programming optimization model (i) to calculate the least-cost dispatch of existing and incremental resources to meet the its load requirements and (ii) to identify what type of supply resource (baseload, seasonal, or peaking) is needed in the event that resources are determined to be inadequate in meeting forecasted requirements (Exh. NEG-1, at 35-36). New England Gas explains that the SENDOUT model provides a solution by creating a daily dispatch based on degree days, system demand and supply availability (id. at 36). The Company states that the SENDOUT model ensures supplies

are economically dispatched using variable costs to determine the order in which supplies should be used while protecting reliability and avoiding penalties (id.).

New England Gas explains that upon determining that there is an incremental need for pipeline capacity, storage capacity or peaking capacity through the use of SENDOUT, it considers a wide scope of potential resource options including pipeline supplies, supplemental supplies and DSM resources to satisfy the identified need (Exh. DTE-2-71). New England Gas states that through an RFP, it then looks to potential qualified vendors to meet the need on an overall least-cost basis, consistent with the Company's cost and non-cost criteria (Company Brief at 13). The Company contends that it evaluates new resources based on cost and non-price characteristics, including reliability, availability date, diversity of supply, flexibility, financial viability and other relevant criteria that may apply to a resource (id. at 13-14).

New England Gas asserts that to apply the model, it examines the forecast of total monthly sendout under normal weather conditions (Exh. NEG-1, at 37). The Company states that, in order to derive a monthly planning load, it removes from the monthly forecast (i) capacity-exempt transportation loads, (ii) non-firm sales loads, and (iii) non-firm transportation loads (id.). New England Gas further claims that daily planning loads are forecasted using estimated daily firm sales sendout per calendar year under normal weather conditions (id.). To develop a normal year daily sendout requirement, the Company analyzes potential explanatory variables in order to develop an equation to predict daily firm sales sendout (id.). The predicted daily sendout requirements are collapsed into monthly totals, which then serve as the input of monthly firm customer requirements (id. at 38). The

Company states that by applying these inputs to the selected weather database, the model creates a daily dispatch that satisfies the predicted gas requirements for each day and produces a report that summarizes the optimal mix-by-month of available resources to satisfy firm requirements (id.).

New England Gas maintains that its supply planning process is designed to develop a resource plan that produces a supply that is reliable, at least-cost, with minimal environmental impact (Company Brief at 13). The Company concludes that the supply planning process provides it with an organized method for analyzing the need for additional resources, identifying new options and reevaluating previous decisions given changed circumstances (id.).

b. Analysis and Findings

The Department has held that in order for an LDC's planning process to minimize cost, that process must adequately consider alternative resource additions, including DSM options, on an equal basis. D.P.U. 93-13, at 83; 25 DOMSC at 233; 15 DOMSC at 115. The Company satisfies this standard through the use of the SENDOUT linear programming optimization model to calculate the least-cost dispatch of existing and incremental resources to meet the Company's load requirements (Exh. NEG-1, at 35-37). Accordingly, the Department finds that the Company's supply planning process incorporates both supply-side and demand-side options into its resource mix, compares all resources on an equal basis and contributes towards a least-cost portfolio.

4. Conclusions on the Supply Planning Process

The Department finds that the Company has: (1) formulated an appropriate process to identify a comprehensive array of supply options, and has developed appropriate criteria for screening and comparing supply resources; (2) formulated an appropriate process for identifying a comprehensive array of DSM options, and has developed appropriate criteria for screening and comparing DSM resources; (3) incorporated both supply-side and demand-side options in its resource mix, and it has compared all resources, including DSM, on an equal basis; and (4) developed a process that facilitates the achievement of an adequate, least-cost, and low environmental impact supply plan. Accordingly, the Department finds that the Company has developed an appropriate supply planning process.

F. Conclusions on the Supply Plan

The Department has found that the Company has established that its normal year, design year, design day and cold-snap supply plans are adequate to meet the Company's forecast sendout requirements throughout the identified time period. In addition, the Department has found that the Company: (1) developed appropriate criteria for screening and comparing supply-side resources; (2) developed appropriate criteria for screening and comparing DSM resources; (3) incorporated both supply-side and demand-side options into its resource mix and has compared all resources on an equal basis; and (4) developed a supply planning process that may lead to the addition of resources that contribute to a least-cost supply plan. Therefore, the Department approves the Company's supply plan for the years 2003/2004 through 2007/2008.

IV. ORDER

Accordingly, after due notice, hearing and consideration, it is

ORDERED: That New England Gas Company's petition for approval of its long-range forecast and supply plan be and hereby is APPROVED; and it is

FURTHER ORDERED: That New England Gas Company shall follow all directives contained herein.

By Order of the Department,

/s/
Paul G. Afonso, Chairman

/s/
James Connelly, Commissioner

/s/
W. Robert Keating, Commissioner

/s/
Judith F. Judson, Commissioner

An appeal as to matters of law from any final decision, order or ruling of the Commission may be taken to the Supreme Judicial Court by an aggrieved party in interest by the filing of a written petition praying that the Order of the Commission be modified or set aside in whole or in part. Such petition for appeal shall be filed with the Secretary of the Commission within twenty days after the date of service of the decision, order or ruling of the Commission, or within such further time as the Commission may allow upon request filed prior to the expiration of the twenty days after the date of service of said decision, order or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the Supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the Clerk of said Court. G.L. c. 25, § 5.